

# PATENT ABSTRACTS OF JAPAN

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## (54) INK FOR INK JET PRINTING

### (57)Abstract:

**PURPOSE:** To provide the ink not causing the clogging of a nozzle, etc., capable of being printed in a high concentration, and used for ink jet printing.

**CONSTITUTION:** The ink comprises a water-insoluble or slightly soluble disperse dye, a dispersing agent, a drying-preventing agent, and water, the disperse dye being dispersed in a particle diameter of 0.1-5 $\mu$ m, the dispersing agent being dispersed in an amount of 50-150wt.% based on the disperse dye, and the drying-preventing agent being contained in an amount of 20-70wt.% based on the whole amount of the ink.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the ink for ink jet textile printing suitable for the print of the textile which becomes a detail from polyester fiber further with respect to the ink for ink jet textile printing.

[0002]

[Description of the Prior Art] Although a screen-printing method, a roller-printing method, rotary screen textile printing, a copy-printing method, etc. have been conventionally used for the textile as an approach of printing a pattern It is necessary to prepare a screen frame, a sculpture roller, a transfer paper, etc. for every modification of a pattern. Since creation of these screen frame, a sculpture roller, and a transfer paper is quite expensive, If a remarkable lot is not produced, it has the fault that it cannot respond to diversification of not only the point that does not suit in respect of being economical but a fashion promptly.

[0003] In order to cancel faults, such as this, a sample is read with a scanner, a computer performs an image processing, the technique which prints the result by the ink jet method is developed, and what dissolved various water soluble dye in an organic solvent or water is known as ink used for ink jet methods, such as this.

[0004] And as water soluble dye, although direct dye, acid dye, reactive dye, etc. had been used, this color had the problem of being inapplicable to polyester fiber.

[0005] then, the ink development for ink jet textile printing using a disperse dye should do -- for example, the distributed process input output equipment thing which made the organic solvent dissolve a disperse dye in JP,50-59108,A -- moreover, the distributed process input output equipment thing which dissolved the disperse dye in water is proposed by JP,54-18974,A.

[0006]

[Problem(s) to be Solved by the Invention] However, the ink for ink jet textile printing of a dissolution mold had the problem that a high-concentration textile-printing product with the low solubility of a disperse dye was not obtained, and, on the other hand, there was a problem that the print which it became a giant particle, or blinding occurred for the nozzle since dispersibility was not perfect, and was stabilized over long duration could not do the ink for distributed process input output equipment ink jet textile printing by the particle of a disperse dye condensing although a high-concentration textile-printing product is obtained.

[0007] this invention person etc. completes header this invention for the new ink in which the above-mentioned trouble was canceled as a result of continuing research wholeheartedly about the textile printing to the textile in the ink jet method of disperse dye ink.

[0008] The object of this invention is to offer the ink for ink jet textile printing which does not produce nozzle blinding etc. and enables high-concentration textile printing.

[0009]

[Means for Solving the Problem] It is attained by the ink for ink jet textile printing characterized by the above-mentioned desiccation inhibitor containing 20 to 70% of the weight to the whole ink while changing from insoluble or poorly soluble a disperse dye, a dispersant, a desiccation inhibitor, and water to water, and distributing the above-mentioned disperse dye with the particle size of 0.1-5 micrometers and the above-mentioned dispersant's containing the above-mentioned object 50 to 150% of the weight to the disperse dye.

[0010] Hereafter, this invention is explained to a detail.

[0011] As a disperse dye used for this invention, an anthraquinone system, an azo system, a nitro diphenylamine system, a methine system, an amino ketone system, a keto imine system, etc. are mentioned. The desirable content of these disperse dyes is 1 - 20 % of the weight to the whole ink, and is 3 - 15 % of the weight still more suitably.

[0012] As a dispersant used for this invention, ligninsulfonic acid, a naphthalene sulfonic-acid formaldehyde condensate, the Sheffer acid, cresol, a sodium bisulfite formaldehyde condensate, etc. are mentioned. The desirable content of these dispersants is 50 - 150 % of the weight to the above-mentioned disperse dye, and is 75 - 125 % of the weight still more suitably. Since the amount of blots to a textile will increase if the dispersibility of a disperse dye is bad, blinding occurs for a nozzle that a dispersant is less than 50 % of the weight and dispersants increase in number more than 150 % of the weight on the other hand, it is not desirable.

[0013] And the above-mentioned disperse dye needs to distribute by 0.2-2 micrometers preferably the particle size of 0.1-5 micrometers. The blinding of a nozzle is easy to generate and is not desirable if the particle size of a disperse dye exceeds 5 micrometers. It is not economical considering effectiveness to form a fine particle to less than 0.1 micrometers on the other hand. And what is necessary is to atomize the dispersion liquid which made the dispersant distribute a disperse dye by the sound mill, the sound grinder, attritor, etc., and just to carry out filtrating with a filter subsequently etc., in order to set particle size of a disperse dye to 0.1-5 micrometers.

[0014] As a desiccation inhibitor used for this invention, glycols, ureas, etc., such as ethylene glycol, a diethylene glycol, triethylene glycol, thiodiethylene glycol, diethylene-glycol wood ether, triethylene glycol wood ether, and polyethylene-glycol wood ether, are mentioned. The desirable content of these desiccation inhibitors is 25 - 50 % of the weight still more suitably 20 to 70% of the weight to the whole ink. Antiflashing of ink is inadequate in a desiccation inhibitor being less than 20 % of the weight, and since the amount of blots to a textile will increase if it increases more than 70 % of the weight on the other hand, it is not desirable.

[0015] Application of the ink for ink jet textile printing which consists of such a presentation embeds an exoergic resistance element in a nozzle. Ink is boiled by the generation of heat. From the Bubble Jet which makes ink breathe out with the pressure of the bubble, the aeropulse method which is made to add and transform an electrical signal into a piezoelectric device, excites the volume change of an ink room, and flies an ink particle, and the nozzle which is carrying out supersonic vibration, carry out application-of-pressure continuation injection, and ink is particle-ized. It carries out with the electrification control system which is made to carry out a passage deflection, divides the inside of control fixed electric field into record and a non-recording particle, and records a particle on a loading dose.

[0016] When the ink for ink jet textile printing of this invention is printed to polyester fiber, To a textile, starches (starch, soluble starch, water-soluble derivative of starch, etc.) A water-soluble cellulosic (a carboxymethyl cellulose, hydroxyethyl cellulose, methyl cellulose, etc.), Sodium alginate, gum arabic, gums (locust bean gum, guar gum, etc.), Water-soluble protein (gelatin, glue, etc.), Sizing agents for textile printing (sodium polyacrylate, polyvinyl alcohol, polyethylene oxide, a polyvinyl pyrrolidone, polyacrylamide, polyethyleneimine, the 4th class-ized water solubility cation polymer, etc.), such as a water-soluble synthetic high polymer, are given. It is desirable to prevent a blot. And after printing by the above-mentioned ink jet method using this textile, a disperse dye comes to fix for fiber by heat-treating a textile.

[0017]

[Example] Hereafter, this invention is explained to a detail based on an example.

[0018] In addition, the test method which is to the bases of the numeric value in an example and the example of a comparison is as follows.

(1) Colorimetry M-Macbeth spectrophotometer 2020 mold (K/S value in the maximum absorption wavelength)

(2) Measure of particle size Measuring equipment : Shimadzu SALD-1100 measuring method : Approach by laser dispersion (Mie scattering)

The class of cel: Flow cell measurement temperature : 20-degree-C time between measurements : 1-second measurement count : 5 times [0019] the plain weave fabric which used example 1 polyethylene terephthalate 50d/18f for warp, used polyethylene terephthalate 50d/18f for the woof, and was woven by 110 warp consistencies/inch and 85 woof consistencies/inch -- preparing -- these textiles -- a well-known approach -- desizing -- heat setting processing was refined and carried out. Then, after carrying out padding of 0.5 % of the weight (product made from Stripes-of-white-paper-hung-from-branches Island Chemistry) of ultra MT, and the processing liquid which consists of 0.5 % of the weight (KIBUN make) of duck algin NSPH, and 99 % of the weight of water as sodium alginate to these textiles as a pH regulator and extracting to 35% of contraction percentages with a mangle, it dried for 2 minutes at 120 degrees C.

[0020] Independently Disperse dye (yellow:) [ C.I.Disperse ] Yellow 88, Magenta:C.I.Disperse Red 349, cyanogen:C.I.Disperse Blue 160, black:C.I.Disperse Black 1 50 % of the weight, Blend 50 % of the weight of ligninsulfonic acid as a dispersant, and it atomizes so that particle size distribution may be set to 0.1-5.0 micrometers in a sand mill. It filtrated after that with the 10-micrometer filter (the product made from Japanese Millimeter Pole Industry, the milli pole filter LC 10.0 micrometer), and the atomization object of a disperse dye was obtained.

[0021] Next, 10 % of the weight of atomization objects of the above-mentioned disperse dye and the ink which consists of 40 % of the weight of diethylene glycols and 50 % of the weight of water as a desiccation inhibitor were carried in the ink jet printer of an aeropulse method, and the 8 dot [/mm ] print of continuation was carried out on the above-mentioned pretreatment textiles.

[0022] Next, the textile-printing textiles which carried out in this way and were obtained were heat-treated for 60 seconds at 210 degrees C, reduction cleaning was carried out at 90 degrees C for 5 minutes with the water solution of sodium-hydrosulfite 2 g/l and soda ash 2 g/l, washing and desiccation were performed after an appropriate time, and the product of an example 1 was obtained.

[0023] Except having blended [ the disperse dye ] 10 % of the weight for ligninsulfonic acid as a dispersant 90% of the weight in example of comparison 1 example 1, the same processing as an example 1 was performed, and the product of the example 1 of a comparison was obtained.

[0024] Except having blended 10 % of the weight of atomization objects of a disperse dye, and 90 % of the weight of water in example of comparison 2 example 1, and having considered as ink, the same processing as an example 1 was performed, and the product of the example 2 of a comparison was obtained.

[0025] Except having not performed atomization and filtration in example of comparison 3 example 1, the same processing as an example 1 was performed, and the product of the example 3 of a comparison was obtained.

[0026] Time amount until the nozzle when carrying out ink jet textile printing using the ink of an example 1 and the examples 1-3 of a comparison carries out blinding was measured. Moreover, K/S value in the maximum absorption wavelength of the product obtained in an example 1 and the examples 1-3 of a comparison were measured. An ink presentation and its result are shown in a table 1 and a table 2.

[0027]

[A table 1]

	染料名	分散化		微粒子化 及び口過	インク		
		分散染料 (重量%)	分散剤 (重量%)		分散染料 ＋分散剤 (重量%)	乾燥 防止剤 (重量%)	水 (重量%)
実施例 1	C.I.D Yellow 88	50	50	有	10	40	50
	" Red 349	50	50	有	10	40	50
	" Blue 160	50	50	有	10	40	50
	" Black 1	50	50	有	10	40	50
比較例 1	C.I.D Yellow 88	90	10	有	10	40	50
	" Red 349	90	10	有	10	40	50
	" Blue 160	90	10	有	10	40	50
	" Black 1	90	10	有	10	40	50
比較例 2	C.I.D Yellow 88	50	50	有	10	0	90
	" Red 349	50	50	有	10	0	90
	" Blue 160	50	50	有	10	0	90
	" Black 1	50	50	有	10	0	90
比較例 3	C.I.D Yellow 88	50	50	無	10	40	10
	" Red 349	50	50	無	10	40	10
	" Blue 160	50	50	無	10	40	10
	" Black 1	50	50	無	10	40	10

[0028]

[A table 2]

	染料名	目詰まりが発生するまでの時間 (分)	K/S値濃度		
			最大吸収波長 (mm)	プリント始	プリント終
実施例 1	C. I. D Yellow 88 " Red 349 " Blue 160 " Black 1	< 1 2 0 < 1 2 0 < 1 2 0 < 1 2 0	4 4 0 5 4 0 6 8 0 5 8 0	9. 1 2 4 1 8. 1 4 5 1 8. 7 3 7 1 1 0. 1 4 3 6	9. 1 3 5 1 8. 2 2 0 1 8. 7 2 4 8 1 0. 1 3 9 4
比較例 1	C. I. D Yellow 88 " Red 349 " Blue 160 " Black 1	5 3 1. 5 0. 8	4 4 0 5 4 0 6 8 0 5 8 0	6. 1 4 2 1 5. 8 4 3 3 4. 1 2 7 4 3. 3 5 4 1	測定不可 " " "
比較例 2	C. I. D Yellow 88 " Red 349 " Blue 160 " Black 1	4 7 2. 5 1. 3	4 4 0 5 4 0 6 8 0 5 8 0	4. 1 4 3 0 4. 1 1 2 7 3. 5 3 2 1 3. 1 4 2 6	測定不可 " " "
比較例 3	C. I. D Yellow 88 " Red 349 " Blue 160 " Black 1	3. 5 1. 2 1. 3 0. 2	4 4 0 5 4 0 6 8 0 5 8 0	3. 1 9 7 4 4. 0 4 2 3 3. 4 4 9 1 3. 0 4 2 2	測定不可 " " "

[0029] When ink jet textile printing is performed using the ink of an example 1 so that clearly from a table 1 and a table 2, there is no blinding of a nozzle, and it turns out that the ink of an example 1 shows good dischargeability. Moreover, it turns out that the product obtained in the example 1 is a high-concentration textile-printing textile.

[0030]

[Effect of the Invention] If the ink for ink jet textile printing of this invention is used as explained in full detail above, the color which employed the property of a disperse dye efficiently can be obtained to high concentration, textile printing which can respond to diversification of a fashion is possible, and it is dramatically useful. Moreover, blinding etc. is not produced over long duration and the effectiveness of improvement in

productivity and improvement in quality is done so.

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[Translation done.]